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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,614	06/15/2001	Seung Hyeon Rhee	2080-3-27	8481

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EXAMINER	
NATNAEL, PAULOS M	

ART UNIT	PAPER NUMBER
2614	8

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/882,614	RHEE, SEUNG HYEON	
	Examiner	Art Unit	
	Paulos M. Natnael	2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6 and 21-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6 and 21-23* is/are allowed.

6)☒ Claim(s) *1 and 24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims **1** and **24** are rejected under 35 U.S.C. 103(a) as being unpatentable over De Haan et al., U.S. Pat. No. 6,034,734 in view of Lim et al., U.S. Pat. No. 6,614,484.

Considering claim 1, De Haan discloses all claimed subject matter, note;

a) at least one field buffer, is met by field memories 11 and 5, fig.1;

b) at least a field motion estimator that estimates field motions between a current field and reference fields, said reference fields being prior or next to said current field, is met by motion estimator 13, Fig.1;

c) at least a field motion compensator operatively coupled between said at least one field buffer and said at least one field motion estimator, said at least one field motion compensator adapted to restore a missing line of said current field using information from an optimally spaced adjacent reference field when said optimally spaced adjacent

reference field is unevenly matched to said current field, is met by Motion compensation stage 7, Fig.1;

d) at least a linear interpolator adapted to restore said missing line of said current field when said optimally spaced adjacent references field is evenly matched to said current field, is met by the disclosure that ""The interpolation filter can either be recursive or transversal, but the number of taps in the temporal direction is preferably small." (col. 3, lines 3-6; see also col. 2, lines 56-66 and col. 6, lines 42-55)

Except for;

e) at least one edge-preserving filter operatively coupled between said at least one field motion compensator and said at least one linear interpolator, said at least one interpolator producing image output of progressive scanning format;

Regarding d) and e), De Haan does not specifically disclose an edge preserving filter. However, as shown above in (d), interpolation and filtering is taught by De Haan. Furthermore, edge preserving or enhancement of the image is well known in the video art. Lim et al., for example, teach a deinterlacing method for video signals based on edge-directional interpolation. Lim et al teach that the edge-directional interpolation (EDI) 200 and the calculates mismatch, makes edge decision and performs edge-directional interpolation. (see also col. 6, line 64 thru col. 7, lines 24) Therefore, it would have been obvious to the skilled in the art at the time the invention was made to modify the system of De Haan et al by providing the edge-directional interpolation (EDI)

of Lim et al so that the image would be edge-enhanced or smoothed by detecting the edge and interpolating the pixel data accordingly.

Considering claim 24, De Haan discloses all claimed subject matter, note;

a) at least one field buffer, is met field memories 11 and 5, fig.1;

b) a field motion estimator that estimates field motions between a current field and reference fields, said reference fields being prior or next to said current field, is met by motion estimator 13, Fig.1;

c) a field motion compensator operatively coupled between said at least one field buffer and said at least one field motion estimator, said at least one field motion compensator adapted to restore a missing line of said current field using information from an optimally spaced adjacent reference field when said optimally spaced adjacent reference field is unevenly matched to said current field, is met by Motion compensation stage 7, Fig.1;

d) at least a linear interpolator adapted to restore said missing line of said current field when said optimally spaced adjacent references field is evenly matched to said current field, is met by the disclosure that ""The interpolation filter can either be recursive or transversal, but the number of taps in the temporal direction is preferably small." (col. 3, lines 3-6; see also col. 2, lines 56-66 and col. 6, lines 42-55)

Except for;

e) at least one edge-preserving filter operatively coupled between said at least one field motion compensator and said at least one linear interpolator, said at least one interpolator producing image output of progressive scanning format;

f) the claimed at least one frame buffer adapted to store said produced image output and unprocessed image input of progressive scanning format;

Regarding d) and e), see rejection of claim 1 (e).

Regarding f), De Haan et al does not specifically disclose a frame buffer. However, Examiner takes an Official Notice in that a frame buffer to store a frame signal is well known in the art and therefore, it would have been obvious to the skilled in the art to modify the system of De Haan by providing a frame buffer to store or delay the signal before outputting it to further processing in the estimation or compensation devices.

Allowable Subject Matter

3. Claims **6, 21-23** are allowable over the prior art.

4. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to disclose at least one frame motion estimator operatively coupled between the at least one frame buffer and the at least one field motion estimator and adapted to generate motion vectors between adjacent image, and at least one frame motion compensator operatively coupled between said at least one frame buffer and said at least one frame motion estimator and adapted to control the size of said motion vectors, as in claim 6;

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paulos M. Natnael whose telephone number is (703) 305-0019. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller can be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PMN
May 14, 2004

PAULOS M. NATNAEL
PATENT EXAMINER